

OBITUARY NOTICES OF FELLOWS DECEASED.

SIR JOHN HAWKSHAW, civil engineer, was born at Leeds in 1811, and was educated at the Grammar School of that town. After serving a pupilage to an engineer of large practice in Yorkshire, he went to South America for a few years to superintend some large copper mines, and soon after his return succeeded George Stephenson as engineer to a railway between Manchester and Leeds. This led to a further connexion with the railways which afterwards expanded into the great group called the "Lancashire and Yorkshire" system, and he soon took a position as one of the most eminent railway engineers in the country.

After he established himself in London, his practice extended to other branches of engineering, and about 1856 he succeeded Mr. J. M. Rendel in directing the construction of the great Harbour of Refuge at Holyhead. He made, with the sanction of the Government, extensive alterations of the original design, and, in consideration of his important services on the work, he received in 1873 the honour of knighthood.

Among other large works of his in Great Britain may be mentioned docks in London, Hull, and Fleetwood; a main drainage system for Brighton; waterworks for Dublin; important improvements in the drainage of the Fen districts; the foundations of the great iron forts at Spithead, and the tunnel, $4\frac{1}{3}$ miles long, lately formed under the Severn. He also devoted much attention to the proposed great tunnel under the Straits of Dover, and considered he had favourably solved the question from an engineering point of view. But, subsequently, he doubted the expediency, on grounds of national policy, of forming such a connexion between the two countries, and withdrew his support from the scheme.

He is best known to Londoners by his extension of the South Eastern Railway from London Bridge to new termini at Charing Cross and Cannon Street, a very difficult and expensive work, cutting through the heart of London, and requiring two large new bridges across the Thames. And though artistic critics doubt whether this has contributed, like the Thames Embankment, to the embellishment of the Metropolis, there can be no question that it has been of immense benefit to the inhabitants; and Sir John always held that æsthetic considerations were out of place if they interfered with works of public utility.

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He was also largely engaged on foreign works. Towards the end of 1863 he visited Egypt, at the request of the Viceroy, to report on doubtful points respecting the Suez Canal, and his emphatic recommendations led largely to its completion. He executed a great ship canal in Holland, made designs for navigating the First Cataract of the Nile, and had to do with railways and other large works in Russia, India, the Mauritius, and Brazil.

He was one of the most active members of the Institution of Civil Engineers, and occupied the position of President in the years 1862 and 1863.

Sir John was not merely a railway maker; he paid much attention to general principles, and some that he strongly advocated may be mentioned. One was the allowance of greater latitude in regard to gradients. The earlier engineers thought that almost any cost should be incurred for the purpose of getting a road as flat as possible; and for very heavy traffic to be carried very cheaply this is always true. But Sir John urged that in a vast number of cases it was preferable to adopt steeper gradients, and so to save original outlay. He relied on the mechanical skill of engineers to work such gradients effectively and safely, and contended that this principle would lead to a great extension of the system in districts where it would be otherwise impracticable. It is remarkable how his predictions have been verified. In the days of George Stephenson, 1 in 264 was thought very steep, and 1 in 100 was said to require stationary engines. Now 1 in 100 is thought nothing of, and 1 in 40 or 50 is allowed for important lines, while for mountain districts we find gradients of 1 in 4, or even steeper still.

Another principle he advocated was that, when the traffic became very large, railways could never be worked to their full advantage unless special lines were allotted to special speeds, thus separating the quick from the heavy traffic. It was a long time before practical railway managers appreciated this idea, but the pressure of increased traffic has lately forced it on them, and it is now being extensively carried out by duplications of many great lines.

In 1875-76 Sir John filled the honourable office (succeeding Professor Tyndall) of President of the British Association, and gave his opening address at Bristol on the 25th August, 1875. He began by saying:—

“Past Presidents have already discoursed on many subjects—on things organic and inorganic—on the mind, and on things, perhaps, beyond the reach of mind; and I have arrived at the conclusion that humbler themes will not be out of place on this occasion.

“I propose in this address to say something of a profession to which my lifetime has been devoted—a theme which cannot, perhaps, be expected to stand so high in your estimation as in my own, and I

may have some difficulty in making it interesting; but I have chosen it because it is a subject I ought to understand better than any other."

Half the address was devoted to the history of works of a nature corresponding to those of modern civil engineering, in a long series, comprising those of the Egyptians, the Assyrians, the Peruvians, the Hindoos and Mahomedans, the Chinese, the Carthaginians, the Greeks, and the Romans, down to the present day. Modern engineering works were then alluded to, particularly steam navigation and the electric telegraph; and in regard to the speaker's own special subject, railways, he dwelt more on economical than constructive views. He pointed out in a striking manner the great benefits that they had conferred on mankind. He said:—

"Railways add enormously to the national wealth. It may be safely assumed that the railways in the British Islands now save the nation a much larger sum annually than the gross amount of all the dividends payable to the proprietors, without at all taking into account the benefit arising from the saving in time. The benefits under this head defy calculation, and cannot, with any accuracy, be put into money. But it would not be at all over-estimating this question to say that in time and money the nation gains at least what is equivalent to 10 per cent. on all the capital expended."

He argued from this that even where a railway would only yield a small dividend to its proprietors, it was to the national interest that it should be carried out by Government aid.

He also alluded to the subject of safety in railway travelling:—

"It is well that the elements on which this depends should be clearly understood. It will be thought that longer experience in the management of railways should go to ensure greater safety, but there are other elements of the question. It depends on the perfection of the machine in all its parts; it depends also on the nature and quantity of traffic; and, lastly, on human care and attention; for so many of these accidents as arise from the fallibility of men will never be eliminated until the race be improved."

He, however, gave some remarkable statistics to show how minute the risk of accident really is, and quoted the saying of a former President of the Board of Trade that he felt safer in a railway carriage than anywhere else. "And," added Sir John, "he was not far wrong."

He took interest in geology, and published, in 1842, some good descriptions of fossil footsteps and fossil trees that had been discovered in works under his care. He further presented to the Manchester Geological Society, in 1843, a somewhat elaborate theoretical paper on the Origin of the Deposits of Coal.

He was elected into the Royal Society, by the propositions of

many eminent Fellows, on the 7th of June, 1855. He served three times on the Council, namely, in 1868-69, in 1874-75, and in 1881-82.

In his later years he gave up active practice; but he retained his faculties to the last, and he died, at the ripe age of 80, on the 2nd of June, 1891.

W. P.

PETER MARTIN DUNCAN was born at Twickenham in 1824, and received his early education in the Grammar School of that village, once the home of Walpole and of Pope. He was afterwards placed for a short time in a school in Switzerland. On his return to England, he entered the Medical Department of King's College, London, in 1842. Here he received his formal scientific training, taking his degree of M.B. London in 1846, and in 1849 he was elected an Associate of his College. After acting for a time as assistant to a doctor at Rochester, he removed to Colchester, where a practice had been purchased for him. Here he resided for many years, and published his first scientific essay, which consisted of "Observations on the Pollen-tube, its Growth, Histology, and Physiology" (1856). But he did not at Colchester secure much time for original research, for most of that which was left him by his profession was occupied by work in connexion with the municipality. During his residence he filled the office of Mayor, thus proving that he had won the confidence of his fellow-townsmen, while the admirable arrangement of the local Museum, which under his direction was reorganised upon lines far in advance of the time, is a sign of his interest in the educational institutions of the town. About 1860 he took a practice at Blackheath, when he was able to spare more time for scientific work, devoting himself to the study of fossil Corals; and, as his interest deepened in the problems which they presented to him, he was led to abandon the lucrative prospects offered by his profession, and to devote himself entirely to original research. In this he was no doubt encouraged by the reception accorded to his first palæontological papers, which were read in 1863, and gained for him recognition as a most able palæontologist. In the following year he was appointed one of the honorary secretaries of the Geological Society, and two years later, he was elected a Fellow of the Royal Society.

After leaving Blackheath, he settled near Regent's Park; but he was not long allowed to remain in retirement, for in 1870 he was called to the Chair of Geology at King's College, and a Fellowship followed in 1871. Shortly afterwards he accepted also the Professorship of Geology at Cooper's Hill, both of which appointments he held till his death. He resigned the Secretaryship of the Geological Society in 1870, after a seven years' tenure of office, and in 1872 he was elected a Vice-President, and President in 1876 and

1877. In 1881 he was awarded the Wollaston Medal, the highest honour which the Geological Society can bestow. Though he was most closely connected with the Geological Society, he was an influential member of other scientific bodies; he served on the Council of the Royal Society from 1876 to 1878, was President of the Geological Section of the British Association in 1879, and of the Microscopical Society from 1881 to 1883.

On turning to Professor Duncan's scientific work, one is impressed by the enormous amount he accomplished, and the wide range of his interests and influence. His first paper (1856) was botanical, and he long retained his attachment to this subject, his last paper on vegetable physiology being published in 1874; while, still later on, he worked out the parasitic Algæ which he discovered in some Silurian Corals. His first important work was the series of five memoirs on the Fossil Corals of the West Indies. The subject was full of difficulties; the living Corals of the area were but little known, so that the materials for the comparison of the recent and fossil faunas were quite insufficient. But Professor Duncan attacked the subject with characteristic energy, and his sound common sense enabled him to avoid many a pitfall; his memoir was certainly a most valuable addition to our knowledge of the later Tertiary Corals. This work was followed by a long list of memoirs, in which he describes the Coral faunas (especially the Cainozoic) of England, Australia, Tasmania, India, Java, Arabia, and Malta. His "British Fossil Corals" is probably one of the best contributions published by the Palæontographical Society; being so much more modern in its method, and more thorough in its treatment, than the work to which it was issued as a supplement.

But though Professor Duncan's interests were probably at first rather zoological than geological, he soon became absorbed in the line of work which he had been led by circumstances to select. He soon realised that the description of the anatomical structure and the determination of the systematic position of a fossil did not constitute the sole duties of a palæontologist; with him these were but preliminary to the consideration of the affinities of faunas and their bearing on the physical geography of the past. He was a palæontologist in the truest sense of the word—not a morphologist who happened to study extinct forms, but a geologist who used fossils as a petrologist uses minerals. Hence his early work on the West India Corals commenced by a detailed study of their conditions of fossilisation, and closed by a discussion of their evidence as to the Cainozoic physiography of the Caribbean region; similarly, his later studies of the European Corals led to his striking paper on "The Physical Geography of Western Europe during the Mesozoic and Cainozoic Periods elucidated by their Coral Faunas."

In his later study of the Echinoidea, he commenced with those in beds the Corals of which he had already examined, among the most remarkable being those from South Australia, which he described in a series of papers dating from 1864 to 1887. It was apparently his interest in the origin of this fauna, with its mixture of Cretaceous and Cainozoic genera, that led him to take up the Indian Echinoids, which, in conjunction with Mr. W. Percy Sladen, F.L.S., he monographed with such detail and care.

He studied with especial interest the Echinoids of the Cenomanian, and by the aid of the small collections of the Rev. W. F. Holland, in Sinai, and of Dr. Carter, in South Arabia, he gradually built up the connexion between the European fauna and that of Northern India. By his comparison of those of the Peninsular and Extra-Peninsular areas he demonstrated the existence of the land-barrier that stretched across India, and away to the south-west, of which such important use has been made in recent controversy. His views on geographical distribution were original, and had been carefully matured; his lecture on "The Formation of the Main Land Masses" showed that he did not accept the views of the permanence of oceans and continents, a subject upon which he was competent to speak with authority. His paper on "The Fauna of the Alpine Lakes" probably dealt the most serious blow ever struck to the theory of the glacial origin of the Swiss lake-basins.

But though Professor Duncan did not regard morphology as the highest end, he did not by any means neglect it; thus our knowledge of the perignathic girdle of the Echinoids and its value in classification we owe mainly to him; while his remarkably suggestive and original essay on the structure of the ambulacra of the regular Echinoidea, perhaps his most masterly piece of work, has gained the highest praise even from men opposed to his views.

In addition to his contributions to palæontology, he has done much in zoology; he wrote a series of papers on the anatomy of the Temnopleuridæ, Saleniidæ, and other groups of the Echinoidea, and described, amongst others, the Madreporaria of the "Porcupine" Expedition, the Ophiurids and Corals of Mergui, and, in conjunction with his constant collaborator, Mr. Sladen, the Echinodermata from Greenland. Two of his most valuable works are "The Revision of the Madreporaria," and his "Revision of the Genera and Great Groups of the Echinoidea." The former was issued in 1885, and consisted of diagnoses of every genus of Coral (excluding the Rugosa), and of a classification which has not yet been supplanted. His revision of the Echinoidea made a great advance in our knowledge of every order. The application of his own discoveries on the ambulacral structure enabled him to bring the Palechinoidea from chaos into order, and to replace the artificial arrangement of the Diadema-

tidæ by a natural classification ; his previous detection of the fundamental differences between the pits of *Temnopleurus* and the fossettes of *Temnechinus* gave him the clue to the arrangement of that group ; and his substitution of positive for comparative diagnoses in many recent genera has greatly aided the comparison of the fossil and deep-sea types. By these two revisions alone Professor Duncan has earned the gratitude of every palæontologist and zoologist, and has given a firm basis for future work. They are indispensable works of reference to every student of these groups.

In addition to the Corals and Echinodermata, Professor Duncan made some contributions to the study of the Protozoa and Sponges, while his clearness as a teacher led him to undertake a good deal of lecturing and popular literary work ; thus he edited the six volumes of 'Cassell's Natural History,' and, amongst others, wrote a primer of physical geography, a volume of biographies of the 'Heroes of Science,' a paper on Voltaire's attitude to geology, and edited recent issues of Lyell's 'Student's Elements.'

To his first love, the Corals, he proposed to return on the conclusion of his revision of the Echinoidea ; he commenced work upon a large Indian collection, and planned a supplement to his revision of the Madreporaria, in which he intended to discuss recent criticisms and incorporate subsequent progress. But it was not to be. He was smitten with disease, and, after a long and painful illness, quietly passed away on the early morning of the 28th of May.

The fine, keen sense of humour, which remained unblunted almost to the last, the genial kindness with which he was ever ready with help, especially to younger men, united with the recognition of his sterling worth and sound judgment, gained him wide popularity and esteem.

HENRY MARTYN JEFFERY was the only son of Mr. John Jeffery, of Gwennap, Cornwall, a parish situated about midway between the towns of Redruth and Penryn. He was born on January 5, 1826, at Lamorran, near Truro, on the banks of the River Fal, at the rectory of his maternal grandfather, the Rev. W. Curgenvin, who married the sister of the distinguished Orientalist and missionary, the Rev. Henry Martyn, B.D., the Senior Wrangler in 1801. Mr. Jeffery was also related to the family of the Rev. Malachy Hitchins, Vicar of St. Hilary, near Marazion, the comparer of the "Nautical Almanac," under Dr. Maskelyne, from 1767 to 1809, and one of the observers of the transit of Venus at the Royal Observatory in 1769. Mr. Jeffery always referred with a natural pride to these two well-known mathematical members of his family.

The early years of Mr. Jeffery were mostly spent at his father's home at Gwennap, but from the age of seven to fourteen he was a pupil at

the Falmouth Grammar School. On leaving this school, in 1840, he exhibited undoubted signs of considerable mathematical and classical ability—so much so that he offered himself as a tutor in a private gentleman's family. The writer of this notice has seen a copy of his letter containing a list of the subjects which he considered himself competent to teach, and from it we may gather that he was really an intelligent youth with more than usual precocity. Fortunately for himself, he was, at the advice of some friends, sent in 1841 to the Grammar School at Sedbergh, Yorkshire, where he was trained by the Rev. J. H. Evans, a late Fellow of St. John's College, Cambridge. Here he remained until 1845. In October of that year he entered as an undergraduate at St. John's College, but soon after migrated to St. Catharine's College, graduating as B.A. in 1849 in the Mathematical Tripos as Sixth Wrangler, and in the Classical Tripos in the Second Class. He proceeded to the degree of M.A. in 1852, and in that year he was adjudged the special distinction of bracketed first Tyrwhitt Hebrew Scholar.

Soon after taking his degree, Mr. Jeffery accepted the post of Lecturer in the College of Civil Engineers at Putney, and in 1852 he was selected by the President and Fellows of Corpus Christi College, Oxford, to fill the office of Second Master of Pate's Grammar School, at Cheltenham. Sixteen years after, on the resignation of the Rev. Dr. Hayman, in 1868, he was appointed to succeed to the vacant Headmastership, an office which he retained with success until his retirement in 1882. Many of his pupils have acknowledged their indebtedness to Mr. Jeffery for their general success in life, some of whom have attained high distinction at the Universities, and in various competitive examinations for admission into the public service.

Although, while at the Cheltenham Grammar School, Mr. Jeffery's official time was more especially devoted to the classical department, it is as a pure mathematician that his name will be most remembered. Shortly after he permanently settled in Cheltenham he commenced the long and continuous series of investigations in pure mathematics which have enriched the pages of the 'Quarterly Journal of Pure and Applied Mathematics,' the 'Proceedings of the London Mathematical Society,' the 'Reports of the British Association,' and other scientific journals. His most important papers have been on pure analysis and analytical geometry, especially on the classification of class-cubics, both in plane and spherical geometry. Instalments of the similar classification for class-quartics have also been published. He had been for some time engaged on the continuation of this work. The titles of a few of his numerous papers will give a sufficient indication of the general character of his investigations:—"Two Theorems in Permutations and Combinations, and a Theorem in Con-

gruencies"; "The Spherical Ellipse referred to Trilinear Coordinates"; "Cubics of the Third Class with Triple Foci, both Plane and Spherical"; "Spherical Class Cubics with Double Foci and Double Cyclic Arcs"; "On Sphero-Cyclides"; "On the Identity of the Nodes of a Nodal Curve of the Fourth Order with those of its Quartic and Sextic Contravariants"; and "On the Genesis of Binodal Quartic Curves from Conics." It appears to have been Mr. Jeffery's intention to prepare a text-book on his favourite subjects. Some progress was made in the preparation of such a work, and he was looking forward with considerable interest to the publication of a treatise which he hoped would prove useful to the student of the higher mathematics. Only last summer, while the writer was enjoying his hospitality, Mr. Jeffery exhibited to him a huge quantity of mathematical manuscript, beautifully written out for the press, in the preparation of which all his recent leisure hours had been devoted. He was anticipating with evident enthusiasm the prospect of an early completion of his labours in this branch of pure mathematics by the production of a text-book; but, alas! his wishes can never be realised, for the small portion of the work prepared for the press exists only as a fragmentary record of his mathematical talents, and of the studious activity of his life to the end. His last original paper was communicated to the London Mathematical Society only a few weeks before his fatal illness, and it was read at the meeting of the Society on November 12, nine days after his decease. In addition to his mathematical work, Mr. Jeffery has occasionally been occupied in other fields of labour, mostly in classics, archæology, and topographical history. In 1853 he wrote, as a coadjutor with Dr. E. R. Humphreys, on classical composition in Greek iambics and Latin prose.

On his retirement from Cheltenham Grammar School Mr. Jeffery, who was never married, took up his residence at Falmouth, partly that he might be in a convenient locality to undertake the management of a considerable amount of house property inherited from his father, and partly on account of the comparatively mild winter climate of his native county. Here he identified himself with the active management of several local scientific institutions, especially of the Royal Institution of Cornwall, at Truro, and the Royal Cornwall Polytechnic Society, at Falmouth, in both of which he had filled the office of Vice-President, and was a valued contributor to their journals. His paper on the "Early Topography of Falmouth," in the 'Journal of the Royal Institution of Cornwall,' is a most important contribution to the local history of that part of Cornwall. Mr. Jeffery was the Honorary Secretary of the new Falmouth Observatory, in which he has taken a great interest since its foundation. Mr. Kitto, the Superintendent, has remarked that he was much

indebted to him for assistance in the initial difficulties of the magnetograph work, a department of the Observatory to which Mr. Jeffery paid a constant personal attention. He also retained much affection for the Falmouth Grammar School, where he received his early education, and this he was always ready to show by his advice and pecuniary support. His loss will be severely felt by all these institutions.

Mr. Jeffery was elected a Fellow of the Royal Society on June 3, 1880, but, owing to the distance of his residence from London, he rarely had an opportunity of attending the meetings. It was, however, a great delight to him to spend a few weeks in London each year, and he usually chose the months of May or June, so that he might enjoy the pleasing association with his scientific friends at one of the annual *conversazioni*. He also took great interest in the meetings of the British Association for the Advancement of Science, at which he was a frequent attendant, and a contributor of papers. For some years past Mr. Jeffery was troubled, more or less, with an internal complaint which occasionally caused him considerable personal inconvenience, and, latterly, he suffered from the effects of insomnia, but still he remained active to within a fortnight of his death, often walking from Falmouth to Truro, a distance of about nine or ten miles, without any apparent fatigue. He was a great lover of long-walking exercise, and, even within a few weeks of his death, though in ill-health, he took a wearying walk of about twelve miles. When the writer visited him in the past summer, Mr. Jeffery appeared to be in better health than usual; but in the middle of October the disease became much aggravated, necessitating an operation, and, after a short illness, accompanied by much suffering, he gradually sank. On the Saturday before his death he became partially unconscious, and on the Monday following wholly so, and in this condition he passed away, peacefully, on the morning of Tuesday, November 3, 1891, in the sixty-sixth year of his age. Three days afterwards his remains were interred in the family vault, with his father and mother, at Gwennap, the country home of his early youth.

E. D.

HENRY BOWMAN BRADY, LL.D., was born in 1835. He was the second son of Henry Brady, of Gateshead, who for fifty years carried on an extensive practice as surgeon in that town. He was educated at the schools of the Society of Friends, at Ackworth, and at Tulketh Hall, near Preston. His father was a naturalist, and instilled into his son a love of nature, which was fostered at his first school; but the influence that shaped his mature career came from the colony of naturalists which has had its headquarters at Newcastle-on-Tyne for several generations. The names of Bewick, Alder, Albany and John

Hancock, and others are those of men whom Newcastle has contributed to the roll of English naturalists, and the Brady family would seem to have been thoroughly permeated with the local enthusiasm for the study of natural history.

On leaving school, in 1850, Brady was apprenticed to the late Mr. Thomas Harvey, pharmaceutical chemist, of Leeds, and in 1855 he entered upon business for himself in Newcastle-on-Tyne.

His conspicuous ability soon gained for him the support of the medical profession and the public, and he laid the foundation of the very extensive business in wholesale and retail pharmacy and scientific apparatus subsequently conducted by the firm of Brady and Martin. During the twenty-one years of his business life, Mr. Brady was closely identified with the Pharmaceutical Society, and he became the President of the British Pharmaceutical Conference in 1872. He was for many years on the Council of the Pharmaceutical Society, and greatly contributed to the progress of that body by developing the scientific education of pharmaceutical chemists.

His more direct contributions to science were in the form of researches in natural history, especially on the Foraminifera. His first publication seems to have been a contribution, in 1863, to the British Association, as a report on the dredging of the Northumberland coast and Dogger Bank; his last was a paper which appeared only a short time ago, on the minute organisms with which his name will always be connected. Between these two he published a large number of researches, including a monograph on Carboniferous and Permian Foraminifera, an exhaustive report on the Foraminifera of the "Challenger" Expedition, as well as monographs on *Parkeria* and *Loftusia*, and on *Polymorphina*, in which he was joint author with Mr. W. K. Parker, F.R.S., and Professor T. Rupert Jones, F.R.S. The report on the Foraminifera is embodied in two quarto volumes, one containing 814 pages of text, and the other 114 plates, which possess great artistic merit. The bibliography of the subject alone occupies forty-six pages of the first volume. The illustrations of such works are of much importance, and the author gave to this department of his work the fastidious care of a skilled draughtsman. By these works he not only established a position both in this country and abroad as one of the highest authorities on the subject, but, what is of more importance, largely advanced our knowledge. Every one of his papers is characterised by the most conscientious accuracy and justice; and though his attention was largely directed to classification and to the morphological points therein involved, his mind, as several of his papers indicate, was also occupied with the wider problems of morphological and biological interest which the study of these lowly forms suggests.

In 1874 he was elected a Fellow of this Society, and in 1888 served

on our Council. In the same year the University of Aberdeen conferred upon him the degree of LL.D., in recognition of his scientific work, and he also received from the Emperor of Austria a valuable gold medal, as a mark of his appreciation of the valuable assistance which Mr. Brady had rendered to the Hof-Museum.

He was a man of slight physique and delicate health, and in later years he was compelled to leave his business and seek refuge in warmer climates than our own. In his travels he visited the United States of America, the Upper Nile, India, Ceylon, Japan, Java, Australia, New Zealand, and various islands of the Pacific Ocean. His last journey was in the winter of 1890, when, with some friends, he visited Cairo and ascended the Nile. He was laid up at Cairo with oedema of the feet and legs, from which he never quite recovered, but the actual cause of his death, which occurred on the 10th of January, 1891, was a rapid attack of pneumonia.

He accomplished an immense amount of work, which remains as a monument to his unwearied patience and industry. His amiability won for him a large circle of friends, and he could have wished no higher tribute to his memory than that offered by Dr. Michael Foster, who wrote as follows in 'Nature,' January 29th, 1891:—"Science has lost a steady and fruitful worker, and many men of science have lost a friend and a helpmate whose place they feel no one else can fill. His wide knowledge of many branches of scientific inquiry and his large acquaintance with scientific men made the hours spent with him always profitable; his sympathy with art and literature, and that special knowledge of men and things which belongs only to the travelled man, made him welcome also where science was unknown, while the brave patience with which he bore the many troubles of enfeebled health, his unselfish thoughtfulness for interests other than his own, and a sense of humour which, when needed, led him to desert his usual staid demeanour for the merriment of the moment, endeared him to all his friends."

The catalogues of the Royal Society show that, down to 1883, Mr. Brady was the author of thirty papers and monographs. He has bequeathed to the Society the very valuable portion of his library which relates to the study of the Protozoa. This collection, which now forms a distinct section of the Society's Library, and for the maintenance and increase of which he made provision, consists of some 150 volumes, including, besides many older works on the subject of great rarity and value, his extensive series of collected excerpt 'Memoirs and Papers relating to the Foraminifera,' gathered, arranged, and annotated by him during many years of labour.

W. C. R.-A.

SIR GEORGE EDWARD PAGET was born at Yarmouth in 1809. He was the seventh of seventeen children, of whom Sir James Paget, Bart., F.R.S., is the only survivor. His early education was at the Charterhouse. He was admitted at Caius College, Cambridge, in 1827, and graduated in Arts as Eighth Wrangler in 1831. He was elected Fellow of his college in 1832, graduated as M.B. in 1833 and as M.D. in 1839, was elected physician to Addenbrooke's Hospital in 1841, and held the office for forty-three years, retiring in 1884, when a marble bust of him was placed in the hospital, as a memorial of his long and valued services. He represented the University of Cambridge on the General Medical Council from 1864 to 1869, and was then chosen President of the Council, from which post he retired in 1874. In 1872 he was appointed Regius Professor of Physic by the Crown, and held the office till his death. He became Fellow of the Royal Society in 1873, and was made K.C.B. in 1885. He became Fellow of the Royal College of Physicians 1839, was made Hon. M.D. Dublin 1867, Hon. D.C.L. Durham 1870, Hon. LL.D. Edinburgh 1871, Hon. D.C.L. Oxford 1872, and was President of the Meeting of the British Medical Association at Cambridge in 1864. His writings were "A Notice of an Unpublished Manuscript of Harvey" in 1850; the "Address as President of the Medical Association" in 1864; the "Harveian Oration" in 1866; and various papers in the medical journals. He married in 1851, and left several children. He died in January, 1892. He was an excellent physician, and enjoyed large practice in and around Cambridge for many years.

He was a man of great ability and firm character, remarkably quick, yet scrupulously accurate, truthful and very cautious, attentive to detail, wise in judgment, and earnest in purpose. By his wisdom, watchfulness, and zeal he largely promoted the success of the Cambridge Medical School; and by his love for his University and his rectitude of character he won the confidence of the men of Cambridge, who all regarded him with respect and affection, and rejoiced in the honour done him by the Queen and by various universities. These qualities and his genial, kind manner gave him a large circle of warm friends. Added to all this, his brightness and cheerfulness, his great stores of accurate information and his inexhaustible fund of anecdotes and stories, the relation of which in his precise and humorous style was most telling, and his fondness of social life made him a delightful companion. He was a spare, brisk, active man, enjoyed good health, and continued conscientiously the duties of his professorship till, having entered his eighty-third year, he succumbed to the influenza in January last.

G. M. H.

SIR JAMES CAIRD was the son of James Caird, of Stranraer. He was born in 1816, educated at Edinburgh High School and University,

and at an early period turned his attention to those agricultural and economic questions to which he eventually devoted the greater part of his life.

In 1849 appeared the first edition of his work on 'High Farming,' and in the autumn of that year he visited Ireland, which was still suffering from the effects of the famine of 1846-47, and reported to the Government upon the agricultural outlook in that island. In the following year 'The Times' obtained the services of Mr. Caird as commissioner to investigate the condition of agriculture in England. His letters to that newspaper constituted the first general account of English agriculture since the time of Arthur Young, and they afterwards appeared in book form. In 1859 he published an account of a visit to the Prairie Lands of the Mississippi Basin, directing attention to their extraordinary agricultural capabilities.

In 1857 Mr. Caird entered Parliament, and in the session of 1864 he at length carried a resolution in favour of the collection of agricultural statistics. As a result of this vote the Agricultural Returns for Great Britain were commenced. These have been issued annually since 1866, and have proved of the highest value. In 1869 he again visited Ireland and published a pamphlet on the Land Question.

After the great Indian famine of 1876-77, Mr. Caird served upon the Commission which was appointed to enquire into the whole subject, and he afterwards embodied his own views and conclusions in his work, 'India; the Land and the People.'

In 1882 Mr. Caird was knighted, being created K.C.B. In 1886 he joined Earl Cowper's Irish Commission, and in 1889, upon the formation of the new Board of Agriculture, Sir James Caird became a member of the Board, and was appointed a Privy Councillor. One of his last undertakings was the preparation, at the request of the Royal Agricultural Society of England, of an account of the work of the Society during the first fifty years of its existence. This valuable retrospect appeared in 1890, in the opening number of the Third Series of the Society's Journal, under the title of "Fifty Years' Progress of British Agriculture."

Sir James Caird was elected a Fellow of the Royal Society in 1875. He was a J.P. for Kirkcudbrightshire, and a D.L. and J.P. for Wigtonshire. He died in London, February 9, 1892.

COLONEL JAMES AUGUSTUS GRANT, C.B., C.S.I., died at Nairn on the 11th February. He was born at Nairn in 1827, "a son of the manse," being the son of the parish minister. After being educated at the Grammar School, and at Marischal College, Aberdeen, he obtained in 1846 a commission in the Indian Army. In India he saw much hard service: was present at the two sieges of Mooltan, the battle of Gujerat, the relief of Lucknow, under Havelock, and

his fingerless right hand bore testimony to the wounds he received.

But his claim to fame and public notice rests upon his work as an African explorer, at a time when a dark pall of ignorance still spread over most of Central Africa, and when the real sources of the Nile were still a mystery. In 1859 Burton and Speke returned from the heart of Africa, after the former had discovered Lake Tanganyika, and the latter Lake Ukerewe, which he named the Victoria Nyanza, and rightly conjectured to be the main source of the Nile. But the two allies quarrelled, and Grant from the first championed his friend Speke, and accompanied him in 1860 when he was commissioned by the Royal Geographical Society to lead an expedition for the exploration of the Victoria Nyanza. Crossing to the mainland from Zanzibar, the travellers marched by Unyanyembé to the country on the west shore of the lake. There they made friends with the King Rumanika, of whom, and the men who constituted the ruling population of the region, Grant often spoke in kindly remembrance. He had a high opinion both of the country and of the people, and was wont to compare the chiefs, with their retainers, to the old chiefs of his native Highlands, who, like them, were cattle rearers and cattle raiders, proud of their descent, scornful of work, but hospitable and honourable after their own fashion. In July, 1862, the explorers reached their goal, the point where the Nile issues from the northern shore of the Victoria Nyanza, thus verifying Speke's prediction. They followed the Nile for 120 miles, when they were obliged to leave it, but they struck it again 70 miles lower down, and at length reached Gondokoro, in February, 1863, where they met Samuel Baker, who had been sent out to assist them. On their return to England the two explorers were received with enthusiasm. Grant was given the Gold Medal of the Royal Geographical Society in 1864, in which year he published an interesting and instructive work, under the title "A Walk across Africa;" he also contributed to the account of the botany of the expedition, which fills a volume of the 'Transactions of the Linnean Society.' In 1866 he was made a Companion of the Bath. In 1868 he served in the Abyssinian campaign, and for his services was made a Companion of the Star of India. He became a Fellow of the Royal Society in 1873.

He was one of the simplest, most modest, and genial of men, and a universal favorite: a man of commanding stature, but with the kindest expression of face. After his return from Abyssinia, his time was mostly spent between London and Nairn. His death has caused a sad blank in the large circle of his friends and acquaintances.

J. T. W.